

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

- 1 1. **(Original)** A charge-switch nucleotide phosphate (NP) probe, said NP
2 probe comprising:
3 an intact NP probe having a terminal phosphate with a fluorophore moiety
4 attached thereto, said intact NP probe having a first molecular charge associated therewith,
5 whereupon cleavage of said terminal phosphate as a phosphate fluorophore moiety, said
6 phosphate fluorophore moiety carries a second molecular charge, wherein the difference between
7 said first molecular charge and said second molecular charge is at least 0.5.
- 1 2. **(Original)** The charge-switch NP probe according to claim 1, wherein
2 either said intact NP probe has a positive molecular charge, or wherein upon cleavage of said
3 terminal phosphate fluorophore moiety, said terminal phosphate fluorophore moiety carries a
4 molecular positive charge relative to said intact NP probe.
- 1 3. **(Currently Amended)** The charge-switch NP probe according to claim 1,
2 ~~wherein said charge-switch NP probe is a nucleotide triphosphate (NTP); and~~ wherein said
3 terminal phosphate is a pyrophosphate with a fluorophore moiety attached thereto.
- 1 4. **(Currently Amended)** The charge-switch NP probe according to claim 1,
2 ~~3, wherein said intact NTP probe~~ wherein said intact charge-switch NP probe has a positive
3 charge.
- 1 5. **(Currently Amended)** The charge-switch NP probe according to claim 1,
2 ~~3,~~ wherein upon cleavage of said terminal phosphate as a pyrophosphate fluorophore moiety,
3 said pyrophosphate fluorophore moiety carries a positive charge relative to ~~said intact NTP~~
4 ~~probe~~ said intact charge-switch NP probe
- 1 6. **(Currently Amended)** The charge-switch NP probe according to claim 1,
2 ~~3, wherein said NTP probe~~ wherein said charge-switch NP probe is a member selected from

3 the group consisting of a deoxynucleotide triphosphate (dNTP), and a nucleotide triphosphate
4 (NTP).

1 **7. (Currently Amended)** The charge-switch NP probe according to claim 6,
2 wherein said ~~NTP~~ **charge-switch NP** probe is a deoxynucleotide triphosphate (dNTP).

1 **8. (Original)** The charge-switch NP probe according to claim 7, wherein
2 said deoxynucleotide triphosphate (dNTP) is a member selected from the group consisting of
3 deoxyadenosine triphosphate, deoxycytosine triphosphate, deoxyguanosine triphosphate
4 deoxythymidine triphosphate and deoxyuridine triphosphate.

1 **9. (Original)** The charge-switch NP probe according to claim 6, wherein
2 said nucleotide triphosphate (NTP) is a member selected from the group consisting of adenosine
3 triphosphate, cytosine triphosphate, guanosine triphosphate and uridine triphosphate.

1 **10. (Original)** The charge-switch NP probe according to claim 1, wherein
2 said fluorophore moiety is a member selected from the group consisting of fluorescein, 5-
3 carboxyfluorescein (FAM), rhodamine, 5-(2'-aminoethyl) aminonaphthalene-1-sulfonic acid
4 (EDANS), anthranilamide, coumarin, terbium chelate derivatives, Reactive Red 4, BODIPY
5 dyes and cyanine dyes.

1 **11. (Original)** The charge-switch NP probe according to claim 3, wherein
2 said fluorophore moiety is attached to said terminal phosphate via a linker.

1 **12. (Original)** The charge-switch NP probe according to claim 11, wherein
2 said fluorophore linker is an alkylene group having between about 5 to about 12 carbons.

1 **13. (Original)** The charge-switch NP probe according to claim 11, wherein
2 said linker carries at least one positive charge.

1 **14. (Original)** The charge-switch NP probe according to claim 11, wherein
2 said linker carries at least two positive charges.

1 **15. (Original)** The charge-switch NP probe according to claim 1, wherein at
2 least one of the phosphate moieties of said nucleotide phosphate probe has an ionized oxygen
3 atom with a counter-cation associated therewith.

1 **16. (Original)** The charge-switch NP probe according to claim 15, wherein
2 said counter-cation is a metal ion.

1 **17. (Original)** The charge-switch NP probe according to claim 16, wherein
2 said metal ion is selected from the group consisting of Mg^{++} , Mn^{++} , K^+ and Na^+ .

1 **18. (Original)** The charge-switch NP probe according to claim 11, wherein
2 said fluorophore moiety is BODIPY TR.

1 **19. (Original)** The charge-switch NP probe according to claim 1, wherein the
2 difference between said first molecular charge and said second molecular charge is selected from
3 the group consisting of 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.0, 2.1,
4 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, and 4.0.

1 **20. (Canceled)**

1 **21. (Original)** The charge-switch NP probe according to claim 1, wherein
2 said charge-switch probe is selected from the group consisting of compound 50, 51, 52, 53, 54,
3 55, 56, 57, 58, 59 and 60 in Figures 6A-D.

1 **22-48 (Canceled)**

1 **49. (Previously Presented)** An intact charge-switch nucleotide phosphate
2 (NP) probe, wherein, upon enzymatic cleavage of said intact charge-switch NP probe to produce
3 a phosphate detectable moiety, said phosphate detectable moiety migrates to an electrode, and
4 said intact charge-switch NP probe migrates to the other electrode.

1 **50. (Previously Presented)** The intact charge-switch NP probe according to
2 claim 49, wherein either said intact NP probe has a positive molecular charge, or wherein upon

3 cleavage of said phosphate detectable moiety, said phosphate detectable moiety carries a
4 different charge relative to said intact NP probe.

1 **51. (Previously Presented)** The intact charge-switch NP probe according to
2 claim 49, wherein either said intact NP probe has a negative molecular charge, or wherein upon
3 cleavage of said phosphate detectable moiety, said phosphate detectable moiety carries a
4 different charge relative to said intact NP probe.

1 **52. (Previously Presented)** The intact charge-switch NP probe according to
2 claim 49, wherein said charge-switch NP probe is a nucleotide triphosphate (NTP); and wherein
3 said phosphate detectable moiety is a pyrophosphate with a fluorophore moiety attached thereto.

1 **53. (Previously Presented)** The intact charge-switch NP probe according to
2 claim 49, wherein said intact NTP probe has a positive charge.

1 **54. (Previously Presented)** The intact charge-switch NP probe according to
2 claim 52, wherein upon cleavage of said phosphate detectable moiety as a pyrophosphate
3 fluorophore moiety, said pyrophosphate fluorophore moiety carries a positive charge relative to
4 said intact NTP probe.

1 **55. (Previously Presented)** The intact charge-switch NP probe according to
2 claim 52, wherein upon cleavage of said phosphate detectable moiety as a pyrophosphate
3 fluorophore moiety, said pyrophosphate fluorophore moiety carries a negative charge relative to
4 said intact NTP probe.

1 **56. (Currently Amended)** The intact charge-switch NP probe according to
2 claim 49, wherein ~~said NTP probe~~ said charge-switch NP probe is a member selected from the
3 group consisting of a deoxynucleotide triphosphate (dNTP), and a nucleotide triphosphate
4 (NTP).

1 **57. (Currently Amended)** The intact charge-switch NP probe according to
2 claim 56, wherein ~~said NTP probe~~ said charge-switch NP probe is a deoxynucleotide
3 triphosphate (dNTP).

1 **58. (Presently Amended)** The intact charge-switch NP probe according to
2 claim **57**, wherein said deoxynucleotide triphosphate (dNTP) is a member selected from the
3 group consisting of deoxyadenosine triphosphate, deoxycytosine triphosphate, deoxyguanosine
4 triphosphate, deoxythymidine triphosphate and deoxyuridine triphosphate.

1 **59. (Previously Presented)** The intact charge-switch NP probe according to
2 claim **56**, wherein said nucleotide triphosphate (NTP) is a member selected from the group
3 consisting of adenosine triphosphate, cytosine triphosphate, guanosine triphosphate and uridine
4 triphosphate.

1 **60. (Previously Presented)** The intact charge-switch NP probe according to
2 claim **52**, wherein said fluorophore moiety is attached to said terminal phosphate via a linker.

1 **61. (Previously Presented)** The intact charge-switch NP probe according to
2 claim **60**, wherein said fluorophore linker is an alkylene group having between about 5 to about
3 12 carbons.

1 **62. (Previously Presented)** The intact charge-switch NP probe according to
2 claim **60**, wherein said linker carries at least one positive charge.

1 **63. (Previously Presented)** The intact charge-switch NP probe according to
2 claim **60** wherein said linker carries at least two positive charges.

1 **64. (Previously Presented)** The intact charge-switch NP probe according to
2 claim **49**, wherein at least one of the phosphate moieties of said nucleotide phosphate probe has
3 an ionized oxygen atom with a counter-cation associated therewith.

1 **65. (Previously Presented)** The intact charge-switch NP probe according to
2 claim **49**, wherein said counter-cation is a metal ion.

1 **66. (Previously Presented)** The intact charge-switch NP probe according to
2 claim **65**, wherein said metal ion is selected from the group consisting of Mg^{++} , Mn^{++} , K^{+} and
3 Na^{+} .